

## Claims

1. A process for producing zeaxanthin and  $\beta$ -cryptoxanthin which comprises cultivating a recombinant microorganism which is expressing a  $\beta$ -carotene hydroxylase gene and belonging to the genus *Xanthophyllomyces* (*Phaffia*) in an aqueous nutrient medium under aerobic conditions, and isolating the resulted carotenoids from the cells of said recombinant microorganism or from the cultured broth.
2. The process according to claim 1, wherein the recombinant microorganism is derived from *Xanthophyllomyces dendrorhous* (*Phaffia rhodozyma*) ATCC96815, or a mutant thereof.
3. The process according to claim 1 or 2, wherein the  $\beta$ -carotene hydroxylase gene is originated from a microorganism which is selected from the group consisting of microorganisms of the genera *Flavobacterium*, *Erwinia*, *Agrobacterium*, *Alcaligenes*, and *Paracoccus*, which are having the  $\beta$ -carotene hydroxylase gene.
4. The process according to claim 1 or 2, wherein the  $\beta$ -carotene hydroxylase gene is originated from a microorganism which is selected from the group consisting of *Flavobacterium* sp. R1534 WT (ATCC21588), *Erwinia uredovora* ATCC19321, *Erwinia herbicola* ATCC39368, *Agrobacterium aurantiacum*, *Alcaligenes* PC-1, *Paracoccus marcusii* MH1, and a gram-negative bacteria E-396 (FERM BP-4283) which are having the  $\beta$ -carotene hydroxylase gene.
5. The process according to claim 1 or 2, wherein the  $\beta$ -carotene hydroxylase gene is originated from *Flavobacterium* sp. R1534 WT (ATCC21588) or the DNA sequence of the  $\beta$ -carotene hydroxylase gene is substantially homologous thereto.
6. The process according to any one of claims 1 to 5, wherein the  $\beta$ -carotene hydroxylase gene is expressed in the recombinant microorganism using the control sequences.
7. The process according to any one of claims 1 to 6, wherein the cultivation is carried out at pH range from 4 to 8 and at a temperature range from 15 to 26°C for 24 to 500 hours.
8. The process according to claim 7, wherein the cultivation is carried out at pH range from 5 to 7 and at a temperature range from 18 to 22°C for 48 to 350 hours.